

# Motorola<sup>®</sup> HOME Radio

## SERVICE MANUAL

RECORD  
CHANGER

MODEL  
RC-37

### DESCRIPTION

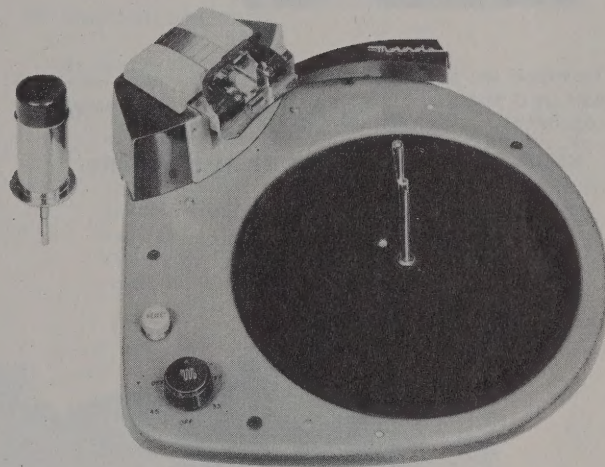
Motorola Model RC-37 Record Changer is a three-speed, single-post changer, designed to play the following records, not intermixed:

- a. ten 12-inch 33 or 78 RPM records, or -
- b. twelve 10-inch 33 or 78 RPM records, or -
- c. twelve 7-inch 45 RPM records, or -
- d. twelve 7-inch 33 RPM records

Both standard and fine-groove records may be played with a specially designed single-point needle. Two interchangeable record spindles are used - a large diameter spindle for 45 RPM records and a small diameter spindle for all other type records.

The last record to drop to the turntable will be repeated until the changer is turned off. The speed control on the changer will stop the turntable; but, since no power switch is incorporated in the changer, the phono motor will continue to run until the "power" or "phono" control on the radio panel is turned off.

The RC-37 changer employs a velocity trip, the operation of which depends upon the speed at which the tone arm approaches the center of the record, not upon any pre-



determined dimension from the center spindle.

The motor is designed to operate on 105 to 120 volts, 60 cycles AC only.

### OPERATION

#### PHONOGRAPH CONTROLS

**SPEED.** The SPEED control determines the speed at which the turntable revolves. Set this control to the position corresponding to the playing speed of the records, viz., record speed 33 RPM, SPEED control to 33; record speed 45 RPM (large center-hole records), SPEED control to 45; or record speed 78 RPM, SPEED control to 78.

**CAUTION:** The SPEED control can be rotated clockwise only from a playing speed position, but it may be rotated in either direction, one position, from OFF.

**REJECT.** The REJECT knob is pushed momentarily and then is released to start playing action or to reject a record before it has completely played.

#### OPERATING PROCEDURE

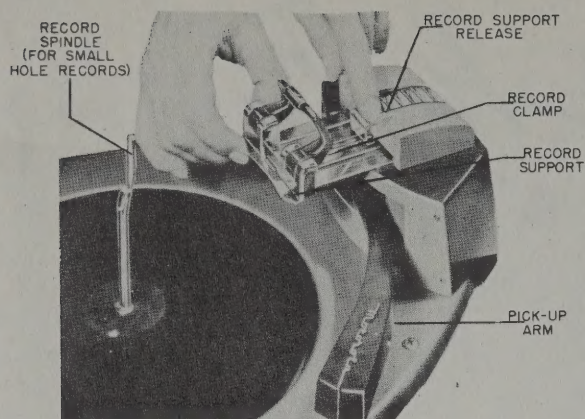
1. Turn the radio power switch "on" and the phono-radio control to the "phono" position.
2. Select the appropriate center post for the records to be played.
  - a. Two spindles are provided: one for small-hole records and one for large-hole records.
  - b. To play small center-hole records, insert the small diameter spindle into the hole in the center of the turntable, and rotate the spindle until the pin drops into the slot in the turntable bushing.

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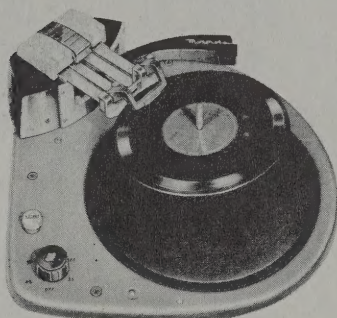




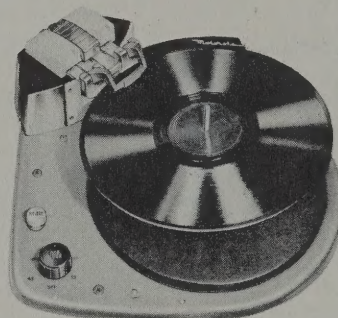
To adjust the RECORD SUPPORT, press down on the RECORD SUPPORT RELEASE and move the record support to the desired position.

FIGURE 1. RECORD SUPPORT ADJUSTMENT

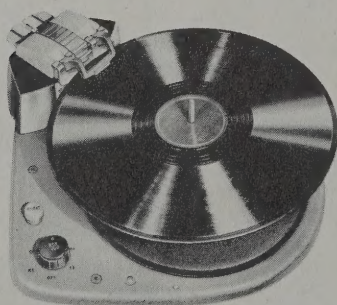
- c. To play large center-hole records, insert the large diameter spindle into the turntable hole and rotate it counterclockwise until it reaches a stop. If the two metal separator discs of the spindle are protruding, remove the spindle, turn the spindle shaft until they disappear, and re-insert it into the turntable.
  - d. To remove a spindle from the turntable, lift it straight up.
3. Adjust the RECORD SUPPORT to the correct position, according to the size record to be played.
    - a. Three positions of the record support are provided: for 7-inch, 10-inch or 12-inch records (see Figure 2).
    - b. To adjust the RECORD SUPPORT, press down on the RECORD SUPPORT RELEASE and move the RECORD SUPPORT to the correct position, according to the size records being played. The RECORD SUPPORT will lock in position (see Figure 1). NOTE: When playing 7-inch 45 RPM records, the RECORD SUPPORT must be in the 7-inch playing position, although the ledge is not used.



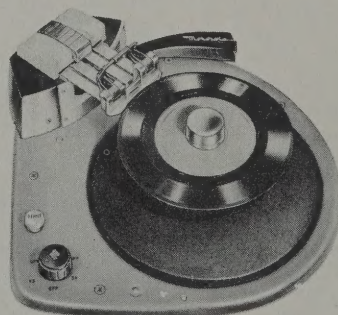
A. To play 7-inch small-hole records, press down on the RECORD SUPPORT RELEASE and move the RECORD SUPPORT to the extreme outward position. Rest the records on the ledge of the RECORD SUPPORT and on the off-set of the small spindle.



B. To play 10-inch records, press down on the RECORD SUPPORT RELEASE and move the RECORD SUPPORT to the middle position (1 1/2 inches in from the extreme outward position). Rest the records on the ledge of the RECORD SUPPORT and on the off-set of the small spindle.



C. To play 12-inch records, press down on the RECORD SUPPORT RELEASE and move the RECORD SUPPORT to the extreme inward position. Rest the records on the ledge of the RECORD SUPPORT and on the off-set of the small spindle.



D. To play 7-inch large-hole records, press down on the RECORD SUPPORT RELEASE and move the RECORD SUPPORT to the extreme outward position. Rest the records on the off-set of the large spindle. Do not lower the RECORD CLAMP.

FIGURE 2. RECORD SUPPORT IN RECORD PLAYING POSITION



4. Load the records.

- a. Raise the RECORD CLAMP to a vertical position.
  - b. Place a stack of records on the center post in the desired sequence, with the last record to be played on top.
  - c. When playing small-hole records, rest them on the ledge of the RECORD SUPPORT and on the off-set of the spindle. Rest large-hole records on the supports on the large spindle.
  - d. Gently lower the RECORD CLAMP on the records. NOTE: DO NOT LOWER THE RECORD CLAMP WHEN PLAYING 7-INCH 45 RPM RECORDS.
5. Adjust the SPEED control to the position corresponding to the playing speed of the records to be played.
6. Momentarily push the REJECT knob.
- a. The bottom record will drop to the turntable, the pick-up arm will lift, swing in, and lower to the record. Playing will now begin.
  - b. The REJECT knob may be pushed to reject a re-

cord before it has completely played. NOTE: Never touch the pick-up arm while the phonograph is in a changing cycle.

7. At the conclusion of playing, and as the last record is being repeated, lift the pick-up arm and move it to the right.
8. Turn the SPEED control clockwise to the OFF position. NOTE: The turntable will stop but the motor will continue to run until turned off, either with the "phono" control or the "power" switch on the radio panel.
9. Turn the power switch on the radio panel "off".

#### TO UNLOAD RECORDS

1. Raise the RECORD CLAMP.
2. Lift the records straight up from the turntable. Do not apply pressure to the top records. Keep the thumbs free. NOTE: If, when removing 45 RPM records from the large spindle, the two metal separator discs are protruding from the spindle, lift both the spindle and the records from the turntable. Rotate the shaft on the bottom of the spindle to retract the discs, and then remove the records.

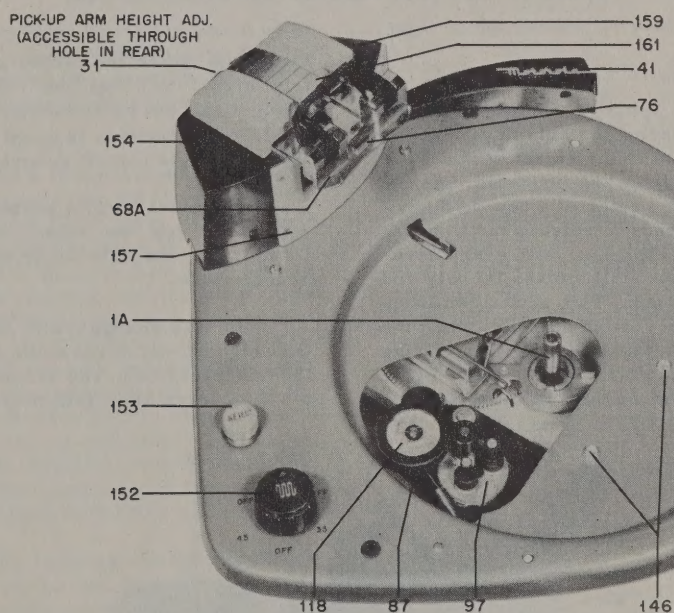


FIGURE 3. TOP VIEW OF RECORD CHANGER WITH TURNTABLE REMOVED

### THEORY OF OPERATION

Refer to Figures 3, 4, 5, 6, 7 and 9 for the location of the various parts described in this section.

The turntable is rim-driven through an idler wheel (118) and a speed control turret (97). The speed control turret is operated by means of a 3-gear train, linking the turret to the speed change shaft assembly (92), which is manually operated by the speed control knob on the record changer base. This control has six positions - 78, 45 & 33 RPM and three "off" positions - controlled by a six-point cam (92A). This

cam permits easy selection of turntable speeds, yet it prevents the speed control turret (97) from jamming the idler wheel (118) against the turntable and causing flat spots. The speed control can be rotated clockwise only from a playing speed position, but it may be rotated in either direction, one position, from OFF.

During the playing of a record, only the motor assembly (87) and the turntable (128) are in operation. The balance of the mechanism is inoperative until the change cycle starts.



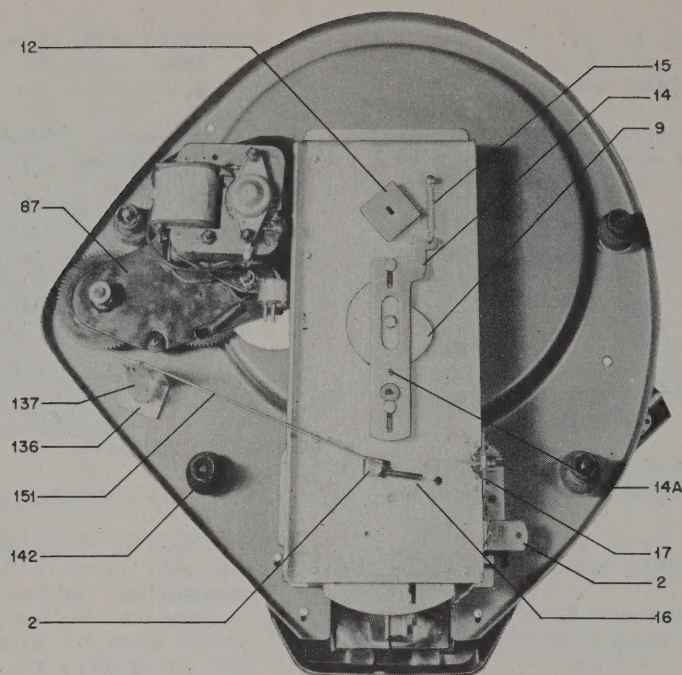


FIGURE 4. BOTTOM VIEW OF RECORD CHANGER

#### THE CHANGE CYCLE

The change cycle may be initiated in two ways - by means of the pick-up arm entering the cut-off grooves in the record or by manual operation of the reject knob. Power for the change cycle is obtained from the turntable. As the pick-up arm (41) approaches the center of a record during playing, the trip arm (35A) tends to release the trip flag (20A) from the trip lever arm (19B); but, with every revolution of the turntable, the wiper (131) strikes the trip rod (20) and resets the trip flag (20A). This action continues until the pick-up arm enters the cut-off grooves, when the movement of the trip arm (35A) is so rapid that the trip flag (20A) cannot be reset by the wiper (131). The change cycle thus is initiated. The trip arm spring (36) has been de-

signed to allow the proper amount of slippage between the trip arm (35A) and the set-down arm (35B) so that the changer will not cycle during the normal playing of a record and yet the friction is great enough to trigger the trip flag (20A) when the cut-off groove is reached.

If the reject knob is pushed manually, the reject arm (2) acting through the reject rod (151), releases the trip flag (20A) from the trip lever arm (19B), thereby starting the change cycle.

Prior to a change cycle, and while the turntable revolves the weighted end of the drive clutch lever (127) is resting on the trip lever (19A). The releasing of the trip flag (20A) from the trip lever arm (19B) allows the trip lever spring (21) to

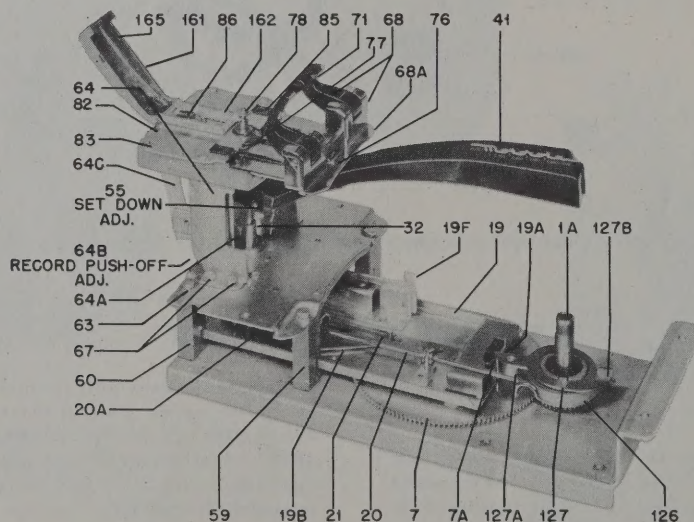


FIGURE 5. VIEW OF RECORD CHANGER WITH BASE & MOTOR ASSEMBLY REMOVED



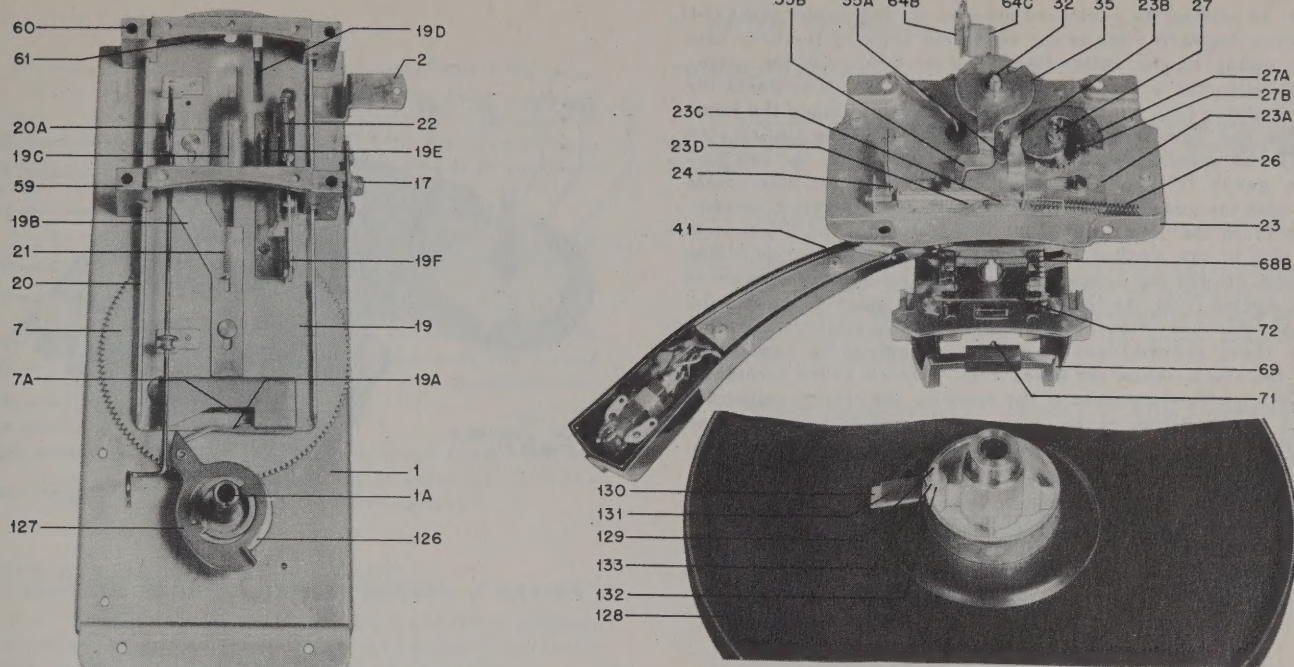


FIGURE 6. DISASSEMBLED VIEW OF RECORD CHANGER MECHANISM

pull the trip lever (19A) away from the drive clutch lever (127), causing the weighted end (127A) of the drive clutch lever (127) to lower. Consequently, the drive dog (127B) of the drive clutch lever contacts the drive screw (129) on the turntable.

Since the turntable continues to revolve when the drive clutch lever (127) engages the drive screw (129), the drive gear (126) causes the cycle gear (7) to turn. As the cycle gear revolves, its roller (7A) moves the slide channel (19) back and, in so doing, the pick-up arm shaft (32) rides up on the incline (19C) of the slide channel, raising the pick-up arm. As the slide channel (19) continues its backward motion, the clutch fingers (19E) will engage the set-down arm assembly (35) to swing the pick-up arm in a direction away from the spindle. At the extreme backward travel of the slide channel (19) the push-off lever (64C), which rides in the slot (19D) of the slide channel, is actuated. This lever, in turn, through the push-off link (77), moves the record push-off lever (76), ejecting the lower record from the record support (68A) and permitting it to drop to the turntable.

While the slide channel (19) is in its extreme backward position, the rear projection on the trip arm (35A) encounters a stud (61) in the rear slide guide block (60), and the trip arm (35A) is reset to its proper position for the next cycle; the restoring lever (19F) lowers the set-down flag (23C) (which will index the pick-up arm when the slide channel makes its forward motion); and the trip slide cocking stud (4) engages the trip arm (19B) with the trip flag (20A) to set it for the next cycle. At this point one-half of the change cycle is completed.

While the cycle gear (7) is in its second half-revolution, the slide channel (19) will move forward, and the clutch fingers (19E) that are still engaging the set-down arm assembly (35) will swing the pick-up arm back toward the record spindle until the set-down arm (35B) contacts the set-down flag (23C), which controls the pick-up arm set-down point. The set-down flag (23C) includes a formed, flat spring (23D) which holds the set-down arm (35B) firmly until the pick-up arm has been lowered to the record, thus preventing "skat-

ing" if the changer is jarred or is setting at a slight angle.

While the arm is being held over the set-down point by the set-down flag (23C), continued rotation of the cycle gear (7) makes the pick-up arm shaft (32) ride down the incline (19C), lowering the pick-up arm onto the record.

As the slide channel (19) approaches the end of the cycle (fully forward position) the set-down flag (23C) is moved out of the way by the restoring lever (19F) to give the pick-up arm complete freedom of movement during playing of the records. Also, the drive clutch lever (127) rides up the trip lever incline (19A) and disengages the drive clutch lever dog (127B) from the drive dog screw (129) in the turntable. The cycle thus is ended.

#### PICK-UP ARM SET-DOWN POINT

The point at which the pick-up arm drops to the turntable for either 7-inch, 10-inch or 12-inch records is determined by the position of the set-down flag (23C).

The movement of the record support assembly (68), when it is adjusted for a specific size record, causes rotation of the gear and pinion shaft assembly (64A), through the rack gear (68B) on the record support. Since the gear and pinion shaft assembly (64A) engages the set-down gear (27B), and the set-down cam (27A) is attached to the set-down gear, any movement of the record support will cause the set-down cam to turn. The set-down cam stud (23B) on the slide plate and spring assembly (23A), rides with the set-down cam, due to the tension of the slide plate spring (26). Therefore, any action of the set-down cam will affect the position of the set-down flag (23C).

#### 45 RPM RECORD DROP

The 45 RPM spindle shaft, when placed into the turntable center hole, fits into the slot in the timing stop (12).

When the change cycle begins, and as the slide channel



(19) is making its backward movement, the reject plate (14) moves forward, due to the eccentric form of the drop cam (9) riding on the roller (14A); and the tension of the spring (15) pulls the reject plate (14) forward until it contacts the timing stop (12), preventing it from rotating. Since the turntable and spindle continue to rotate, while the timing stop (12) and spindle shaft (169) remain stationary, the two pinion gears (171) in the upper section of the spindle rotate around the gear on the spindle shaft. The eccentric extending from the upper end of the two pinion gears (171) runs in a slot in the molded record supports to produce an action which causes the supports to move in against the tension of the spring (172). As the plastic record supports recede, the separator discs mounted above each record support separate the lower record from the stack and support the remainder of the stack, while the lower record drops to the turntable. With continued rotation of the spindle, the record supports, due to the action of the spring (172), will move out to support the record stack, while the separator discs recede into the spindle.

When the slide channel (19) is making its forward movement, the reject plate (14) moves back, releasing the timing stop (12) and allowing the timing stop and the spindle shaft to revolve for the playing of the record.

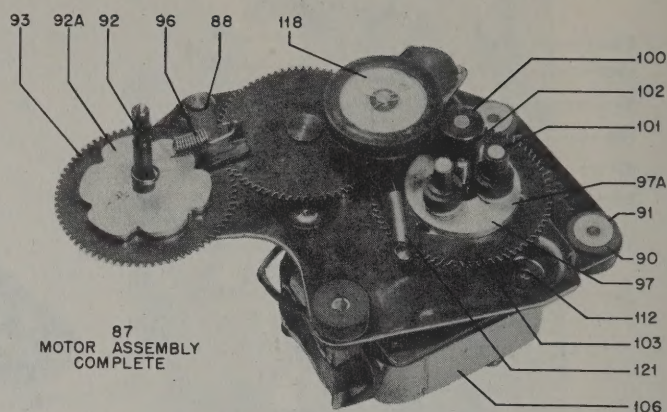


FIGURE 7. MOTOR & SPEED CHANGING ASSEMBLY

## MAINTENANCE

It is recommended that the service man thoroughly study and familiarize himself with the operation of the integral parts of the record changer and analyze the trouble carefully before attempting to make any adjustments or to do any repair work on the record changer.

Should it become necessary to remove the changer from the cabinet, or the changer mechanism from the base plate,

the service man is advised not to remove parts or sections of the changer unnecessarily, since the changer then may require readjustment.

The changer will not operate properly, either in the cabinet or on the repair bench, unless it is level. If the changer is working satisfactorily, leave it alone.

## ADJUSTMENT

### NEEDLE SET-DOWN ADJUSTMENT

A template (Motorola Part No. 54B792330), furnished with the record changer, is required to index the needle to the correct set-down point after a needle or cartridge has been replaced. If a template is not available, one may be improvised as follows:

1. Draw a circle of 3-5/16 inches radius on a piece of cardboard.
2. Punch out a 17/64 inch diameter hole at the exact center of the circle.

To index the needle to the correct set-down point:

1. Place the small diameter spindle in the turntable and the template over the spindle.
2. Move the record support to the 7-inch record playing position.
3. Rotate the turntable by hand and push the reject knob to start the change cycle. Watch the needle carefully. It must land on the curved line of the template.
4. If the needle does not land on the line, adjust the set-down setscrew (55) located on the pick-up arm (see Figure 12). Turn the setscrew clockwise to move the

pick-up arm towards the spindle, or turn it counterclockwise to move the pick-up arm away from the spindle. IMPORTANT: Turn the screw very slightly, and repeat steps 3 & 4 until the needle lands exactly on the curved line.

5. When the needle is set correctly for the 7-inch position, the index will be set automatically for 10-inch and 12-inch records.

### PICK-UP ARM HEIGHT ADJUSTMENT

If the pick-up arm strikes the bottom record of a stack of records resting on the 45 RPM spindle, or if the pick-up arm does not rise sufficiently to clear a 1-inch stack of records after they have dropped to the turntable, proceed as follows:

1. Remove the cabinet back or remove the record changer from the cabinet, as required, to gain access to the rear of the record changer.
2. The height adjustment screw (31) is accessible thru a hole in the rear of the record support housing (154) (see Figure 3).
3. Turn the height adjustment screw (31) clockwise to raise the arm, or counterclockwise to lower the arm, as required.



## PUSH-OFF LEVER ADJUSTMENT

If a record fails to drop to the turntable, check the position of the record push-off lever (76) on the record support during a change cycle. It should protrude a minimum of 1/32 inch from the record support during the record dropping portion of the change cycle. If adjustment is required, proceed as follows:

1. Remove the cabinet back or remove the record changer from the cabinet, as required, to gain access to the rear of the record changer.
2. Push the reject knob to place the changer in cycle and rotate the turntable by hand until the record push-off lever (76) is at its point of maximum forward travel.
3. Turn the push-off adjustment screw (64B) until the push-off lever (76) protrudes at least 1/32 inch beyond the lip (68A) of the record support.

## TURNTABLE DRIVE PIN ADJUSTMENT

If a "clicking" noise is heard while a record is playing, the drive dog adjusting screw (129) on the bottom of the turntable is touching the drive dog (127B). To remedy:

1. Remove the turntable. NOTE: Do not remove the drive clutch lever (127); also, do not lose the bearing washer (124).
2. Loosen the hex nut (133) and turn the drive dog adjusting screw (129) counterclockwise to bring the screw farther from the drive dog. CAUTION: Do not turn the screw too much, since the screw will not engage the drive dog and, as a consequence, the changer will fail to cycle.
3. Tighten the hex nut (133).

4. Replace the turntable.

## TRIP ADJUSTMENT

If the mechanism does not trip after playing a record, or trips before a record has completed its play, proceed as follows:

1. Remove the turntable (128).
2. Measure the distance between the outer edges of the hub on the turntable and the point of contact of the trip rod on the wiper (131). The dimension should be approximately 7/8 inch. Bend the wiper bracket (130), if necessary.
3. Check the operation by playing a 78 RPM record and a 33 RPM record. If the changer trips too soon at 78 RPM, bend the wiper bracket (130) downward slightly (toward the trip rod). If the changer does not reject at 33 RPM, bend the wiper bracket (130) upward slightly (away from the trip rod).
4. If the above adjustment does not correct the trouble, remove the changer from the cabinet and proceed as in steps 5 & 6.
5. Check the reject operation visually. Move the trip flag (20A) outward until it is flush with the projection on the trip lever arm (19B). As the turntable is rotated, the wiper (131) should contact the trip rod (20A) very lightly. Bend the wiper bracket (130), if necessary.
6. If the adjustment in step 5 is correct, and the changer still does not reject properly, check for any looseness or binding of the trip arm (35A) on the set-down arm assembly. The pressure required to move the trip arm (35A), measured from the tip of the trip arm, should be 10 to 18 grams. Replace the trip arm spring (36), if necessary.

## PARTS REMOVAL & REPLACEMENT

### TO REMOVE RECORD CHANGER FROM CABINET

1. Disconnect the power and phono input leads from the record changer.
2. Remove the changer from the cabinet, as shown in Figure 8.

### NEEDLE REPLACEMENT

Replace the needle with a Motorola needle of the proper type only; otherwise, damage to the records or crystal cartridge will result. Two types of cartridges and needles, as described below, are used in the Model RC-37 changer. The needles are not interchangeable between the two cartridges.

1. Motorola needle, Part No. 59K691908, is used in the Shure cartridge. It is held in the cartridge with a small, round, knurled nut (see Figure 10). To replace the needle, loosen the nut and remove the needle.
2. Motorola needle, Part No. 59K691909, is used in the Electro-Voice cartridge. It is not held with a nut, but is pushed into the cartridge (see Figure 11). To remove the needle, pull it from the cartridge with

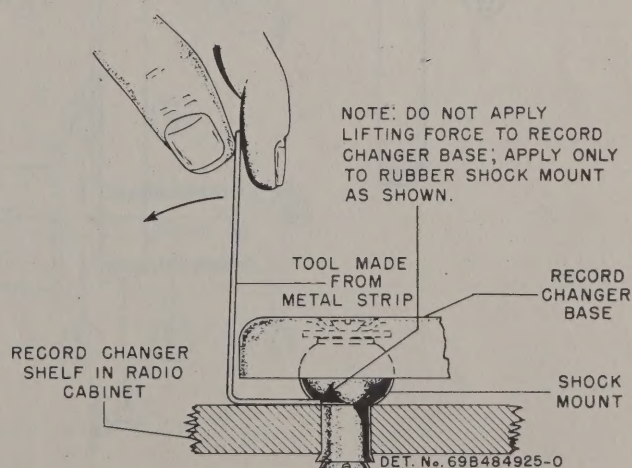


FIGURE 8. REMOVAL OF CHANGER FROM CABINET











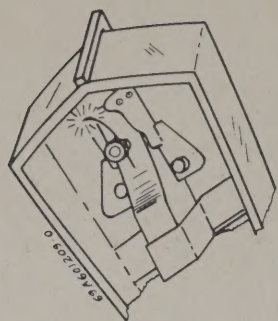


FIGURE 10.  
SHURE NEEDLE REPLACEMENT

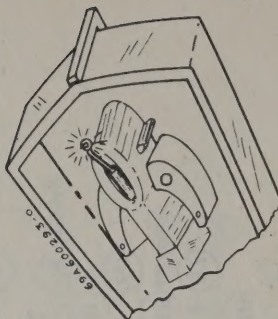


FIGURE 11. ELECTRO-VOICE  
NEEDLE REPLACEMENT

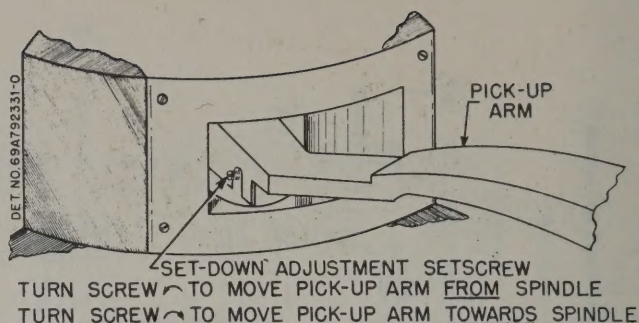


FIGURE 12. NEEDLE SET-DOWN ADJUSTMENT

fingers or pliers.

**IMPORTANT:** The needles should be held in the cartridges perpendicular to the surface of the record. After the needle has been replaced, check the set-down point as outlined in NEEDLE SET-DOWN ADJUSTMENT.

#### CARTRIDGE REPLACEMENT

Two types of cartridges, Shure and Electro-Voice, are used. The two cartridges are interchangeable. To remove the cartridge, merely remove the retainer clip (49) and disconnect the pick-up leads. **IMPORTANT:** After the cartridge has been replaced, check the needle set-down point as outlined in NEEDLE SET-DOWN ADJUSTMENT.

#### TO REMOVE THE TURNTABLE

1. Remove the turntable retaining clip (134).
2. Lift the turntable straight up from the base plate. Be sure the bearing (125) and the bearing washers (124) do not get lost or dirty.
3. When replacing the turntable, it will be necessary to center the drive clutch lever (127) and the bearing washer (124) to allow proper seating of the turntable over the spindle post.

#### TO REPLACE THE DRIVE CLUTCH LEVER

1. Place the changer mechanism in the rest position [slide channel (19) in full forward position], with the trip flag bracket (20A) engaged in the trip lever arm (19B).
2. Place the drive clutch lever (127) in position with the weighted end (127A) resting at the bottom of the trip lever incline (19A).

#### TO REMOVE THE DRIVE GEAR

1. Remove the turntable and drive clutch lever (127).
2. Lift the drive gear (126) straight up from the spindle post.
3. When replacing the drive gear (126) it is important that the changer be timed correctly. To time the

changer, rotate the cycle gear (7) until the cycle gear roller (7A) is directly in line with the spindle post (1A), and pull the slide channel (19) forward until it is locked by the trip flag (20A). Then place the drive clutch lever (127) in position on the drive gear (126), and mesh the gears so that the weighted end of the clutch lever (127A) rests on the lowest edge of the trip lever incline (19A). Check the timing by playing a stack of 45 RPM records. If a record of the stack fails to drop during a cycle, move the drive gear (126) one "tooth" and play another stack of records to again check the timing.

#### TO REMOVE THE RECORD SUPPORT HOUSING COVER AND RECORD SUPPORT HOUSING

1. Remove the four Phillips head screws (158) that secure the housing cover (157) to the housing (154).
2. Remove the four hex head screws (156) and four washers (155), accessible from the bottom of the changer, that secure the housing to the base plate.

#### TO REMOVE THE SLIDE RELEASE HINGE AND HINGE BRACKET

1. The record support slide release hinge (161) is held

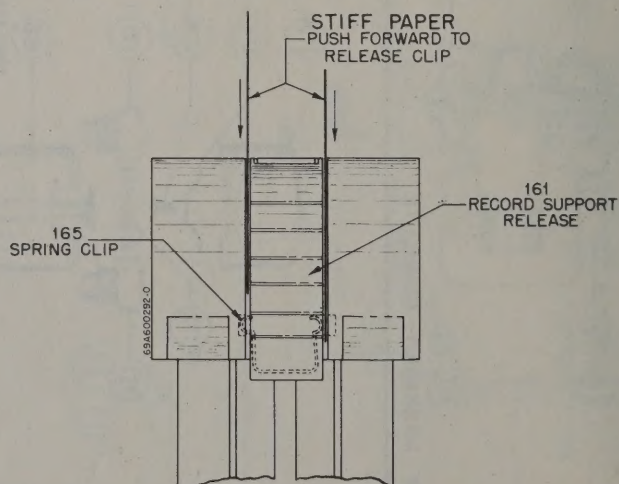


FIGURE 13. REMOVAL OF RECORD SUPPORT RELEASE



in place with a spring clip (165). To release the clip, place a piece of stiff paper on both sides of the release hinge, between the release hinge and the slide cover (159). See Figure 13. Pull the paper forward, simultaneously lifting upward on the release hinge.

2. Remove the four machine screws (164) holding the slide release hinge bracket (162).

#### TO REMOVE THE COMPLETE CHANGER MECHANISM AND MOTOR ASSEMBLY

1. Remove the record support housing cover (157) and housing (154).
2. Remove the speed control knob (152).
3. Disconnect the reject rod (151).
4. Remove the turntable and drive clutch lever (127).
5. From the bottom of the changer, remove one machine screw (148) securing the motor assembly (87) to the base plate (135).
6. Remove the four Phillips head lockscrews (147).
7. Remove the two hex head screws (146).
8. Carefully lift the base plate from the motor and changer mechanism.

#### MOTOR SPEED CONTROL TURRET ASSEMBLY REPLACEMENT

**CAUTION:** Do not disassemble the speed changing mechanism without first marking the positions of turret assembly, the speed change gears, and the speed change cam, as shown in Figure 14. But, if the turret has been removed accidentally, or if the above precaution has not been taken, the assembly procedure is as follows (refer to Figures 9 & 14).

1. Assemble the speed control pulleys (100), (101), (102) to the turret plate (97A). They are snapped over the pulley shafts, and they can be pried off with a screwdriver. Note that the 45 RPM pulley is adjacent to the part number on the turret plate, as shown in Figure 14.
2. Attach the turret plate (97) and the speed change gear (103) to the speed control bracket with the turret spring washer (104) and the two machine screws (105).
3. Place the speed change shaft assembly (92) and the speed change gear (93) on the speed control bracket. Do not tighten the collar bushing (94) to the shaft.
4. Rotate the turret assembly until the correct angle is obtained between the center of the turret plate and the speed change shaft and 33 RPM speed control pulley, as in Figure 14. Use a combination square with a protractor, or other accurate protractor, for measuring the angle.
5. Lift the speed change gear (93) from the idler gear and rotate it until the slot in the shaft is in the direction shown in Figure 14 and the speed detent pawl (88) falls into the detent in the speed change cam (92A). There are two detents, on opposite sides of the cam, into which the pawl may fall. The correct detent is the one which will permit clockwise rotation only of the speed change shaft.
6. Tighten the setscrew (95) in the collar bushing (94).
7. Attach the motor (106) to the studs on the speed control bracket with the "C" washers (113).
8. Attach the tension springs (121), (96), (115). Note that the idler wheel spring (121) hooks into a soldering lug (117) under the idler wheel.
9. Check the complete assembly for the correct speeds and the sequence of speeds.

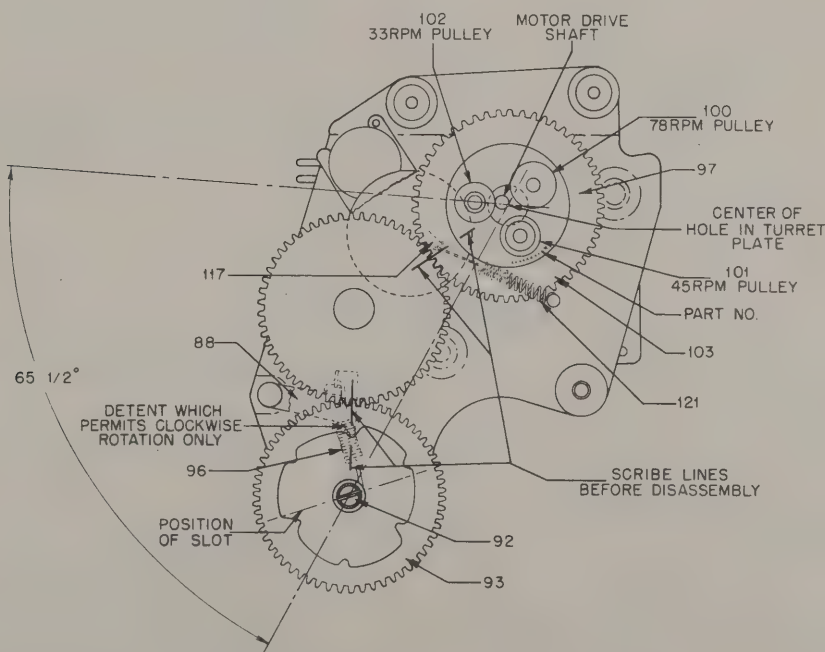


FIGURE 14. MOTOR GEAR TRAIN ASSEMBLY



## PICK-UP ARM MOUNTING PLATE ASSEMBLY REPLACEMENT

If it is necessary to remove the pick-up arm mounting plate assembly (23), the following precautions should be observed when replacing the assembly.

1. Move the record support to the 12-inch playing position.
2. Align the hole in the set-down cam (27A) with the hole in the mounting plate. The stud (23B) on the set-down flag (23C) should be on the outside of the cam.
3. Move the set-down flag (23C) to the "up" position.
4. Carefully place the pick-up arm mounting plate (23) on the slide guide blocks (59) and (60), making sure the trip assembly (35) does not rest or bind on any portion of the slide channel assembly (19).
5. If the set-down arm and trip assembly (35) has been loosened or removed from the pick-up arm shaft (32) readjust as follows:
  - a. Place the turntable, small spindle, and template (see section on NEEDLE SET-DOWN ADJUSTMENT) on the spindle post.
  - b. Move the record support to the 7-inch record playing position.
  - c. Push the manual reject arm (2), to start the

change cycle.

- d. Slowly rotate the turntable until the slide channel assembly (19) starts to move backward. NOTE: The SPEED control should be in an "off" position for ease of operation.
- e. As the pick-up arm shaft (32) rides up on the incline (19C) of the slide channel (19), raise or lower the set-down arm and trip assembly (35) until it is in a position to be grasped by the clutch fingers (19E).
- f. Continue rotating the turntable until the slide channel moves forward to a point where the set-down arm (35B) touches the set-down flag (23C).
- g. With the fingers, move the set-down arm (35B) against the guiding edge of the set-down flag (23C).
- h. Rotate the turntable until the set-down arm (35B) is just about to lose contact with the set-down flag (23C), and place the pick-up needle directly over the line on the template.
- i. Tighten the setscrew (37) in the set-down arm and trip assembly (35).
- j. Cycle the changer several times to check the needle set-down point. Small corrections of the set-down point may be made with the set-down adjustment screw (55).

## LUBRICATION

Factory lubrication should be sufficient for a long period of service. When lubrication is required, use only the following lubricants in the places specified.

<u>Part</u>	<u>Lubricant</u>
Turntable Bearing (125) & Slide Channel (19)	-E. F. Houghton "Stay-Put" #512 Grease (Motorola Part Number 11M476047)
Motor Speed Change Gears (93 & 103)	-Silicone High Temperature Lub- ricant (Dow Corning Corp. #DC-33 - Motorola Part Num- ber 11M488020)

### DO NOT LUBRICATE THE FOLLOWING PARTS:

Trip flag (20A)  
Slide Plate & Spring Assembly (23A)  
Trip Lever Arm (19B)  
Set-Down Arm Assembly (35)  
Drive Clutch Lever (127)

If any oil or grease should come in contact with the idler wheel tire, inside rim of the turntable, or any of the motor, drive surfaces, clean with carbon-tetrachloride.

## SERVICE HINTS

### 78 RPM or 33 RPM RECORDS FAIL TO DROP

1. Adjust the push-off lever (76).
2. Record center hole binding on spindle.

### MECHANISM SLOW IN STARTING

1. Bad motor.
2. Grease on idler wheel (118) or on speed control pulleys (100, 101, 102).
3. Parts binding.

### PICK-UP ARM DOES NOT SET DOWN IN CORRECT POSITION

1. Adjust the set-down setscrew (55).

### NEEDLE JUMPS GROOVES

1. Record changer not level.
2. Records dirty - clean with soap and water.
3. Needle not set correctly in the cartridge - it should be perpendicular to the surface of the record.



MECHANISM TRIPS BEFORE RECORD IS COMPLETED,  
OR DOES NOT TRIP AFTER RECORD IS COMPLETED

1. Adjust the wiper bracket (130) on the turntable (see section on Trip Adjustment).

CONTINUOUS CYCLING

1. Drive clutch lever (127) 180° out of phase. Reverse the position of the drive clutch lever on the drive gear (126).
2. Grease or dirt on trip flag (20A).
3. Set-down flag (23C) not being actuated by restoring lever (19F).

RECORD SUPPORT CANNOT BE ADJUSTED TO THE  
THREE RECORD PLAYING POSITIONS

1. Set-down cam (27A) not set properly with relation to the set-down cam stud (23B). See PICK-UP ARM MOUNTING PLATE ASSEMBLY REPLACEMENT.

MECHANISM FAILS TO TRIP WHEN REJECT KNOB IS  
IS PUSHED

1. Reject rod (151) not connected.
2. Trip lever spring (21) weak or not connected.

TURNTABLE DOES NOT REVOLVE

1. No power to motor.
2. Bad motor.
3. Grease on the idler wheel (118) or on speed control pulleys (100, 101, 102).
4. Turntable not seated properly.

45 RPM RECORDS FAIL TO DROP

1. Drive gear (126) does not mesh correctly with the cycle gear.
2. Record center hole binding on spindle.



# REPLACEMENT PARTS LIST

NOTE: When ordering parts specify model number of set in addition to part number and description of part.

Ref. No.	Part No.	Description	List Price	Ref. No.	Part No.	Description	List Price
1	1X691802	Mounting Plate Riveted Assembly (includes items 1 through 6) .....	4.05	59	46C691368	Block, slide guide .....	.50
2	45B691361	Arm, manual reject .....	.20	60	1X600895	Block, slide guide: includes item 61 .....	.55
3	5A691472	Rivet, shoulder .....	.05	61	46A600738	Stud, reset .....	.05
4	46A691227	Stud, trip slide cocking .....	.05	62	4S7651	Lockwasher, int: #8 cad pl...per/c	.50
5	5K600898	Rivet, shoulder .....	.25	63	382963	Screw, machine: 8-32 x 1-3/4" plain hex head; cad pl .....	.20
6	46A691273	Stud, reject plate slide .....	.40	64	1X691820	Record Support Housing Assembly: complete with push-off lever & gears .....	2.10
7	1X691803	Cycle Gear, Shaft & Roller Assembly	1.75	65	1X691963	Bracket Lock Assembly .....	.20
8	4A691767	Washer, spring .....	.10	66	588497	Rivet: .088 x 1/8; stl; nkl pl per/c	.50
9	45A691256	Cam, record drop (45 RPM) .....	.50	67	387350	Screw, machine: 6-32 x 1/4; slotted hex head lock screw; cad pl.....doz	.15
10	4S7569	Washer, flat: 5/16 x .145 x .027; cad pl .....	.50	68	1X691824	Record Support & Clamp Assembly: complete; includes items 69 through 74 .....	2.00
11	3S7247	Screw, machine: 6-32 x 3/16; slot- ted hex head lock screw; cad pl .....	.15	69	1X691964	Clamp Assembly, record hold-down...	.35
12	46A691309	Stop, timing .....	.25	70	41A691279	Spring, extension .....	.15
13	42A600415	Clip .....	.20	71	35A600113	Bumper, rubber .....	.20
14	1X691843	Reject Plate & Roller Assembly ....	.35	72	41A691795	Spring, push off restoring .....	.05
15	41A76925	Spring, coil tension .....	.05	73	58691794	Rivet, shoulder .....	.20
16	41A600699	Spring, manual reject .....	.05	74	46A600523	Stud, drive .....	.15
17	9A470260	Receptacle, 1-prong .....	.15	75	46A691243	Pin, spring retainer .....	.15
18	3S7506	Screw, sheet metal: #6 x 1/4 PKZ plain hex head; cad pl.....per/c	.50	76	47K691953	Lever, record push-off .....	.75
19	1X600757	Slide Channel Assembly: complete; includes items 20, 21 and 22.....	3.25	77	1X691826	Push-Off Link & Bushing Assembly...	.20
20	1B600748	Trip Flag and Trip Rod Assembly ...	.25	78	46A691235	Stud, slide locking .....	.05
21	41A691469	Spring, trip lever arm actuating...	.05	79	41A691466	Spring, coil .....	.15
22	41A14244	Spring, tension coil .....	.55	80	4S8279	Washer, flat: 5/16 x .125 x .027; cad pl .....	.50
23	1X600761	Set-Down Flag and Pick-up Arm Mounting Assembly: complete; in- cludes items 24 through 29.....	3.25	81	4K692188	Washer, "C" .....	.20
24	41A600766	Spring, set-down flag detent....doz	.30	82	64B691342	Plate, record rest cover .....	.25
25	5S7769	Rivet: .088 x 3/32 stl; .....per/c	.50	83	382950	Screw, machine: 4-40 x 1/4 slotted locking binderhead; cad pl ....doz	.15
26	41A691282	Spring, slide plate .....	.05	84	43K471634	Ball, steel .....	.05
27	1X691813	Set-Down Cam & Gear Assembly .....	.50	85	42A691405	Clip, ball bearing .....	.35
28	4K692188	Washer, "C" .....	.20	86	41A691467	Spring, extension .....	.05
29	5A790684	Grommet, rubber .....	.35	87	59D600612	Motor Drive Assembly: complete; in- cludes items 88 through 122 .....	10.25
30	1X691815	Pick-up Arm Brkt. & Stud Assembly..	.60	88	45A691223	Pawl, speed detent .....	.15
31	3A691288	Screw, pick-up arm adj .....	.05	89	5K691481	Rivet, shoulder .....	.05
32	47A691221	Shaft, pick-up arm .....	.45	90	37K15125	Grommet, rubber .....	.50
33	46A691268	Pin, pick-up carriage .....	.05	91	5A12105	Eyelet, mounting .....	.20
34	3S3863	Set screw: 4-40 x 1/4 Bristo head; cad pl .....	.05	92	1X691965	Speed Change Shaft Assembly .....	.35
35	1B600752	Set-Down Arm and Trip Arm Assembly.	.75	93	44A691219	Gear, speed change .....	.15
36	41A600856	Spring, clutch .....	.25	94	43A17431	Bushing, collar: brass .....	.10
37	3S3866	Set screw: 6-32 x 3/16 Bristo head; cad pl .....	.10	95	3S7113	Set screw: '8-32 x 1/4 slab head....doz	.50
38	46C691431	Counterbalance, pick-up arm .....	.70	96	41A691280	Spring, pawl extension .....	.05
39	3S1452	Screw, machine: 4-40 x 1/2 slotted binderhead; cad pl .....	.50	97	1X691966	Speed Control Turret Assembly: in- cludes items 98 through 102 .....	2.50
40	4S7683	Lockwasher, int: #4; cad pl...per/c	.50	98	4A691407	Washer, felt .....	.15
41	1X691817	Pick-up Arm Assembly: includes items 42 through 55 .....	8.10	99	42A691438	Clip, pulley retainer .....	.15
42	45D691428	Arm, pick-up: arm only .....	.50	100	49A691333	Pulley, speed control (78 RPM)....	.60
43	1X691818	Pick-up Cartridge Leads Assembly...	.20	101	49K691337	Pulley, speed control (45 RPM)....	.60
44	9A72670	Contact, pin terminal .....	.50	102	49A691335	Pulley, speed control (33 RPM)....	.60
45	59B691430	Cartridge, crystal: with needle (Shure) .....	6.75	103	44A691219	Gear, speed change .....	.15
46 or	59K691907	Cartridge, crystal: with needle (Electro Voice) .....	6.75	104	4A691214	Washer, turret spring: phosphor bronze .....	.10
47	59K691908	Needle (for 59B691430 cartridge)...	1.50	105	3S490530	Screw, machine: 3-48 x 3/16 slotted round head; cad pl .....	.15
48	59K691909	Needle (for 59K691907 cartridge)...	1.50	106	59C600611	Motor, phono .....	6.00
49	42A691429	Clip, cartridge retainer .....	.05	107	28A16313	Plug, phono motor: 3-prong; with shell .....	.05
50	1X691819	Pick-up Arm Plate & Bushing Assem..	.45	108	15A690616	Shell, phono motor plug (used with item 107) .....	.05
51	3S490739	Screw, sheet metal: #4 x 1/4 PKZ Phillips binderhead; cad pl ...doz	.15	109	42A600114	Clamp, phono motor plug (used with item 107) .....	.25
52	4S7683	Lockwasher, int: #4 cad pl...per/c	.50	110	4S7657	Lockwasher, ext: #8; cad pl...per/c	.50
53	3S490535	Screw, machine: 4-40 x 5/16 Phil- lips flat head; cad pl .....	.15	111	3S3397	Screw, sheet metal: #8 x 5/16 PKZ plain hex head; cad pl .....	.50
54	41A691329	Spring, torsion .....	.10	112	46A600613	Stud, motor mtg .....	.25
55	3S9710	Set screw: 4-40 x 5/16 slotted head- less .....	.05	113	4K600617	Washer, "C" .....	.25
56	4K580282	Washer, spring: phosphor bronze.do	.15	114	4K691439	Washer, insulating .....	.50
57	4A16556	Washer, spring .....	.50	115	41A691284	Spring, motor extension .....	.05
58	3S2286	Screw, machine: 4-40 x 3/16 slotted hex head lock screw; cad pl.....doz	.15	116	1X691967	Idle Wheel Bracket Assembly .....	.25
				117	29R3042	Lug, soldering .....	.15



Ref. No.	Part No.	Description	List Price	Ref. No.	Part No.	Description	List Price
118	49A691277	Wheel, idler .....	.55	148	3S7279	Screw, machine: 8-32 x 5/8 slotted binderhead; cad pl .....	.50
119	42A691893	Clip, hair pin .....	.15	149	47A600721	Shaft, manual reject .....	.10
120	46A691420	Pin, groove .....	.20	150	4K600617	Washer, "C" .....	.25
121	41A691281	Spring, idler extensior .....	.05	151	47A600719	Rod, manual reject .....	.05
122	29R5301	Lug, soldering .....	.15	152	36B691483	Knob, speed control .....	.20
123	3S7279	Screw, machine: 8-32 x 5/8 slotted binderhead; cad pl .....	.50	153	36A600725	Knob, reject control .....	.10
124	4A691286	Washer, bearing .....	.30	154	15D691488	Housing, record support .....	1.15
125	43A691278	Bearing, turntable .....	.20	155	4S8279	Washer, flat: 5/16 x .125 x .027; cad pl .....	.50
126	44B691354	Gear, drive .....	.35	156	3S400038	Screw, thread cutting: #4 x 5/16; type 25; plain hex head cad pl .....	.15
127	1X691827	Drive Clutch Lever & Stud Assembly.	.25	157	15C691393	Cover, housing .....	.40
128	1X600773	Turntable Assembly: complete; in- cludes items 129 through 134.....	2.90	158	3S490532	Screw, thread cutting: #2 x 3/8 PKF Phillips oval head; nkl pl .....	.15
129	3A691225	Screw, drive dog adjusting .....	.10	159	15C691395	Cover, slide .....	.25
130	7A600745	Bracket, wiper .....	.10	160	42A691415	Fastener, slide cover .....	.15
131	37A600771	Wiper, plastic .....	.20	161	55B691391	Release Hinge, record support slide; chrome pl .....	.75
132	4S7651	Lockwasher, int: #8; cad pl ..per/c	.50	162	7B691418	Bracket, slide release hinge.....	.20
133	2S7003	Nut, hex: 8-32 x 5/16; cad pl..per/c	.50	163	47A691424	Shaft, slide release hinge .....	.05
134	42K692053	Clip, speed .....	.05	164	3S490352	Screw, machine: 2-56 x 5/32 slotted binderhead; cad pl .....	.15
135	1X600775	Record Changer Base Assembly: in- cludes items 136 through 139.....	4.10	165	41A691463	Spring, retainer .....	.05
136	1X600776	Bracket Assembly, manual reject: includes items 137 & 138 .....	.25	166	4S8406	Lockwasher, int: #2; cad pl...per/c	.50
137	7A600723	Bracket, manual reject actuating...	.10	167	47C691499	Spindle, record: 33 & 78 RPM.....	1.65
138	5K691481	Rivet, shoulder .....	.05	168	1X691832	Spindle, record: 45 RPM; complete..	3.50
139	43A600718	Bushing, manual reject shaft .....	.05	169	1X691834	Drive Gear & Shaft Assembly .....	.30
140	3S400110	Screw, machine: 10-32 x 1-3/4" Phillips flat head; antique copper finish .....	.25	170	42A691283	Clip, shaft .....	.15
141	4S8214	Washer, flat: 7/8 x .203 x .067.doz	.25	171	1X691835	Record Support & Separator Assembly	.40
142	35A481870	Mounts, shock: rubber .....	.15	172	41A691406	Spring, compression .....	.05
143	43A484295	Sleeve, shock mount.....doz	.25	173	1X691836	Center Post Cap & Spring Assembly..	.50
144	2A484296	Nut, shock mount: tapered tee...doz	.40	174	41A691253	Spring, spindle cap .....	.05
145	37A17361	Grommet, rubber .....	.25	175	3S7164	Screw, machine: 6-32 x 1/4 slotted binderhead; cad pl .....	.50
146	3S7205	Screw, machine: 8-32 x 1/4 slotted hex head lockscrew; cad pl .....	.15	176	4S7666	Lockwasher, ext: #6; cad pl...per/c	.50
147	3S400218	Screw, machine: 6-32 x 1/4 Phillips binder head lockscrew; nkl pl..doz	.15	177	3S488082	Screw, machine: 6-32 x 1-3/4" slotted round head; cad pl .....	.05

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